

# **Quick-Look Report: Joint High Speed Vessel**

(Vehicle Interoperability)



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# Marine Corps Warfighting Lab, Quantico, Virginia

## LOE Phase 1.A. (Vehicle Interoperability)

18 Oct 01

Event #	Event Description	Method	Data Evaluation
1.	<b>"Single" vehicle compatibility/maneuverability:</b> A. Starboard Aft Quartering Ramp B. Main Vehicle Deck C. Internal Ramps D. Mezzanine Deck	<i>Note: Prior to all RO/RO events a DC will measure the height between the vehicle deck and pier in order to determine tide effects on ramp angle.</i>	* The Ops Log will be used for detailed explanations of any Discrepancy or Unknown values.  ** For appropriate "turning" maneuverability, it has been determined that a <b>5-point turn</b> is the maximum allowed for favorable assessment aboard the JHSV.
1.A 1.A (1)	<b>Starboard Aft Quartering Ramp</b> (1) Verify that ramp deployment is unassisted.	(1) DC's will observe ramp deployment.	(1) Was ramp <u>deployment</u> assisted by equipment external to the HSV?  <u>No:</u> Ramp deployment was unassisted.
1.A (2)	(2) Determine ramp preparation/deployment time	(2) DC's will time ramp preparation & deployment.	(2) Ramp deployment time: <i>Two ramp deployments were observed:</i> 1. <u>29 min 15 sec</u> 2. <u>12 min 37 sec</u>
1.A (3)	(3) Determine ramp compatibility with Pier.	(3) Observations will be made regarding any unusual actions that occur between the ramp and pier. All systems that are adjoined to the pier will be considered a component of the and will be assessed accordingly.	(3) Did the ramp-pier interface create any unusual actions (flexing, lateral/vertical movement, bending/ buckling, pier or ramp damage)?  <u>Unk:</u> Wave action within basin caused fore-aft movement of the ramp on pier. Constant scraping of ramp on concrete. No damage to ramp or pier observed. Long term effect unknown.

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Event #	Event Description	Method	Data Evaluation
1.A (4)	(4) Determine vehicle maneuverability and compatibility with stern ramp.	(4) As vehicle transits ramp from pier, DC observations will be made regarding traction, contact with ramp sides, ramp stability or any other unusual actions that occur.	<p>(4) During transit over the ramp did any vehicle experience a loss of traction, bottom contact or near contact with ramp surface, curbs, overhead, stanchions, cables, etc)?</p> <p><b>IFAV:</b> <u>No</u>  <b>M998 HMMWV:</b> <u>No</u>  <b>M923:</b> <u>No</u>  <b>M923/welding trlr:</b> <u>No</u></p> <p><b>M915/M872 trlr:</b> <u>Yes:</u> While transiting the starboard aft quartering ramp the left rear tires of the M915 Truck, Tractor experienced a momentary "<b>loss of traction</b>" but successfully traversed the ramp. However, as the M872 trailer attempted to transit ramp the "stowage box" mounted on the left side of the trailer undercarriage <b>could not</b> clear the first "knuckle" (i.e. elevated flex point) of the ramp. Tractor and trailer were backed off the ramp and disqualified from further testing as "<u>non-accessible</u>" equipment.</p> <p><b>AAV:</b> <u>No</u>  <b>EBFL (ATLAS):</b> <u>No</u>  <b>RT-4000 Forklift</b> <u>No</u></p>
1.A (5)	(5) Verify ramp recovery is unassisted.	(5) DC's will observe ramp recovery.	<p>(5) Was ramp <u>recovery</u> assisted by equipment external to the HSV?</p> <p><u>No:</u> Ramp recovery was unassisted</p>
1.A (6)	(6) Determine ramp preparation/recovery time.	(6) DC's will time preparation & recovery.	<p>(6) Ramp recovery time: (<i>One ramp recovery observed</i>)</p> <p><b>1. <u>11 min 15 sec</u></b></p>

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Event #	Event Description	Method	Data Evaluation
<b>1.B</b> 1.B (1)	<b>Main Vehicle Deck (Single Vehicle ONLY)</b> (1) Maneuverability within <b>main stowage</b> .	(1) A single test vehicle will transit the ramp from the pier. Once each vehicle successfully transits ramp it will maneuver around the <b>main deck</b> and under the centerline ramp as directed by ground guides. Maneuverability will encompass turning radius, parking, backing, visibility, etc,.	(1) During transit through the <b>main deck</b> did any vehicle experience maneuverability problems: - poor visibility - more than 5-point turns - loss of traction - contact with bulkheads-stanchions - cause damage to pad-eyes  <b>IFAV:</b> <u>No</u> <b>M998 HMMWV:</b> <u>No</u> <b>M923:</b> <u>No</u> <i>*Note. The M923(without trailer) had to make two (2) 5-point turns to traverse the main vehicle deck.</i>  <b>M923/welding trlr:</b> <u>Unk.</u> The M923/welding trailer was unable to navigate the forward turning area of the main vehicle deck. The welding trailer had to be disconnected from the truck and debarked by the ATLAS (EBFL) forklift. Embark SME's have determined that the position of two (2) ISO containers was such that they restricted the turning radius of the truck/trailer. Therefore, this event should be re-evaluated at the next LOE. <u>No conclusions</u> will be drawn as to this vehicles maneuverability on the main vehicle deck until follow-on testing is concluded.  <i>*Note. The M923/welding trailer was disqualified from further testing during this LOE.</i>  <b>AAV:</b> <u>Yes.</u> The AAV's caused damage to the "beer can" pad-eyes while pivoting to maneuver through the main deck. The aluminum pad-eyes were gouged, dented, and split in various areas. If it is determined to maintain this tie-down system then the only measure to prevent damage is to use wooden dunnage to cover the pad-eyes during AAV operations. This increases onload-offload time and may be a limiting factor to load plans.  <b>EBFL (ATLAS):</b> <u>No</u> <b>RT-4000 Forklift</b> <u>No</u>

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Event #	Event Description	Method	Data Evaluation
1.B (2)	(2) Adequacy of vehicle overhead clearances.	(2) As vehicles transit the <b>main stowage</b> area DC's will observe overhead clearances and potential obstructive areas.	(2) As vehicles transit the <b>main stowage</b> area did any vehicle experience maneuverability problems due to overhead obstructions?  <b>IFAV:</b> <u>No</u> <b>M998 HMMWV:</b> <u>No</u> <b>M923:</b> <u>No</u> <b>AAV:</b> <u>No</u> <b>EBFL (ATLAS):</b> <u>No</u> <b>RT-4000 Forklift</b> <u>No</u>
<b>1.C</b> 1.C (1)	<b>Mezzanine Ramps</b> (1) Compatibility of "internal" <b>ramps</b> with vehicles.	(1) Following maneuverability in the main stowage area, individual test vehicles will transit the mezzanine <b>ramps</b> to access upper stowage areas. DC observations will be made regarding traction, contact with ramp sides, ramp stability or any other unusual hindrances to maneuverability.	(1) As vehicles transit the mezzanine <b>ramps</b> did any vehicle experience maneuverability problems? -poor visibility -more than 5-point turns -loss of traction -contact with bulkheads-stanchions -cause damage to pad-eyes  <b>IFAV:</b> <u>No</u> <b>M998 HMMWV:</b> <u>No</u>
1.C (2)	(2) Adequacy of vehicle overhead clearances while transiting the mezzanine <b>ramps</b> .	(2) As vehicles transit the mezzanine <b>ramps</b> , DC's will observe overhead clearances and potential obstructive areas.	(2) As vehicles transit the mezzanine <b>ramps</b> did any vehicle experience maneuverability problems due to overhead obstructions?  <b>IFAV:</b> <u>No</u> <b>M998 HMMWV:</b> <u>No</u>

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Event #	Event Description	Method	Data Evaluation
<b>1.D</b> 1.D(1)	<b>Mezzanine Deck</b> (1) Maneuverability within mezzanine <b>deck</b> area.	(1) Once vehicle successfully transits <b>deck</b> area it will maneuver through the mezzanine deck as directed by ground guides. Maneuverability will encompass turning radius, parking, backing, visibility, etc.,	(1) During transit through the mezzanine <b>deck</b> area did the vehicle experience any maneuverability problems: -poor visibility -more than 5-point turns -loss of traction -contact with bulkheads-stanchions -cause damage to pad-eyes  <b>IFAV:</b> <u>No</u> <b>M998 HMMWV:</b> <u>No</u>
1.D(2)	(2) Adequacy of vehicle overhead clearances while transiting the mezzanine <b>deck</b> area.	(2) As vehicles transit the mezzanine <b>deck</b> areas DC's will observe overhead clearances and potential obstructive areas.	(2) During transit through the mezzanine <b>deck</b> areas did any vehicle experience maneuverability problems due to overhead obstructions?  <b>IFAV:</b> <u>No</u> <b>M998 HMMWV:</b> <u>No</u>  <i>*Note. For both IFAV and HMMWV, the top outside edges of the vehicle's roof came <u>close</u> to bulkhead support beams that have angle inserts in all corners which reduce overhead clearance in those corner areas. Contact not likely but possible if vehicle takes wide approach.</i>
<b>2.</b>	<b>Multi-vehicle compatibility &amp; maneuverability:</b> A. Main Vehicle Deck B. Mezzanine	<i>All test vehicles will load aboard the JHSV to validate staging capabilities and maneuverability when deck space is minimized or obstructed by other vehicles.</i>	

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Event #	Event Description	Method	Data Evaluation
2.A 2.A(1)	<b>Main Vehicle Deck (Multiple Parked Vehicles)</b> (1) Maneuverability within main stowage.	(1) Single test vehicle will transit the ramp from the pier. With maneuver space minimized by parked vehicles/cargo, each test vehicle will attempt to traverse and park in various locations of the <b>main deck</b> . Maneuverability will encompass turning radius, parking, backing, visibility, etc.,	<p>(1) During transit and staging on the <b>main deck</b> did the vehicle experience any maneuverability problems:</p> <ul style="list-style-type: none"> <li>-poor visibility</li> <li>-more than 5-point turns</li> <li>-loss of traction</li> <li>-contact with bulkhead-stanchion-other vehicles</li> <li>-cause damage to pad-eyes</li> <li>-able to access designated staging spots</li> </ul> <p><b>IFAV:</b> <u>Unk</u> Concern for <u>possible</u> damage to IFAV size vehicles staged on the Mezzanine ramp and deck during at-sea transits. Vehicle overhead clearance is minimal (approx 1 inch). During at-sea transits any vertical motion will cause vehicle contact with overhead and possible damage. Appropriate tie-downs or increased overhead clearance is recommended.</p> <p><b>M998 HMMWV:</b> <u>Unk</u> There is concern for possible damage to HMMWV size vehicles staged on the Mezzanine <u>ramp</u> and <u>deck</u> during at-sea transits. Vehicle overhead clearance is minimal in these areas (approx. 1 inch). During at-sea transits any vertical motion will cause vehicle contact with the overhead and possible damage to the vehicle. Appropriate tie-downs or increased overhead clearance is recommended.</p> <p><b>M923:</b> <u>No</u></p> <p><b>AAV:</b> <u>Unk</u> While backing under the Hoistable Ramp it was noted that the top most part of the AAV turret <u>appeared</u> to be in "near contact" with a "slack" overhead cable. The AAV did not back-up a sufficient distance to actually determine if contact would have been made, but SME observation identified the <b>possibility</b>. Future LOE's with AAV's should re-examine and verify.</p> <p><b>EBFL (ATLAS):</b> <u>Unk</u> When the ATLAS (EBFL) came aboard to remove the welding trailer from the M923, it was noted that the ATLAS forks were still down and extended. This configuration made maneuverability in the forward areas of the vessel more difficult. A hydraulic malfunction on the ATLAS prevented the operator from raising the forks.</p> <p><b>RT-4000 Forklift</b> <u>No</u></p>

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Event #	Event Description	Method	Data Evaluation
2.A(2)	(2) Suitability of lashing, tie-downs, pad-eyes.	(2) Once vehicles have successfully parked in designated locations the operators will attach appropriate tie-downs. DC's will assess the use of these tie-downs as maneuverability obstructions, deck space restrictions, stability enhancement, etc.,. DC's will assess pad-eyes regarding location, quantity, strength, etc.,.	<p>(2) For each vehicle, were tie-down devices:</p> <ul style="list-style-type: none"> <li>-compatible</li> <li>-functional</li> <li>-operable</li> <li>-obstructive to maneuvering vehicles</li> <li>-squander / waste stowage space</li> </ul> <p> <b>IFAV:</b> <u>Unk</u>  <b>M998 HMMWV:</b> <u>Unk</u>  <b>M923:</b> <u>Unk</u>  <b>AAV:</b> <u>Unk</u>  <b>EBFL (ATLAS):</b> <u>Unk</u>  <b>RT-4000 Forklift</b> <u>Unk</u> </p> <p><i>*Note. Appropriate tie-down devices were NOT available for testing. However, they may be <u>required</u> for IFAV / HMMWV sized vehicles on the Mezzanine ramp and deck during at-sea transits. Vehicle overhead clearance is minimal in these areas (about 1 inch). During at-sea transits any vertical motion will cause contact and possible damage to the vehicle. Appropriate tie-downs may reduce the vehicles "vertical" motion and therefore "reduce (not eliminate)" subsequent damage.</i></p>
2.A(3)	(3) Suitability of staged vehicles on main deck	(3) After vehicles are staged, DC's will assess accessibility by operators/maintainers, efficient use of available deck space, proximity to obstructions (Horizontal/vertical), etc.,.	<p>(3) After vehicles were staged was personnel accessibility restricted by proximity to other vehicles or obstructions (i.e. operator and maintainer access):</p> <p> <b>IFAV:</b> <u>No</u>  <b>M998 HMMWV:</b> <u>No</u>  <b>M923:</b> <u>No</u>  <b>AAV:</b> <u>No</u>  <b>EBFL (ATLAS):</b> <u>No</u>  <b>RT-4000 Forklift</b> <u>No</u> </p> <p><i>*Note. At least one side of every vehicle was accessible by personnel.</i></p>



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Event #	Event Description	Method	Data Evaluation
2.B 2.B(1)	<b>Mezzanine Ramp</b> (1) Maneuverability & staging on Mezzanine ramps	(1) Single test vehicle will transit the <b>ramp</b> from the main vehicle deck to the Mezzanine. With maneuver space minimized by parked vehicles/ cargo, each test vehicle will attempt to traverse and park at designated locations on the Mezzanine <b>ramp</b> . Maneuverability will encompass turning radius, parking, backing, visibility, etc.,	(1) As vehicles transit the mezzanine <b>ramps</b> did staged vehicles present any maneuverability problems: <ul style="list-style-type: none"> <li>-poor visibility</li> <li>-more than 5-point turns</li> <li>-loss of traction</li> <li>-contact with bulkhead-stanchion-other vehicles</li> <li>-cause damage to pad-eyes</li> </ul> <b>IFAV:</b> <u>No</u> <b>M998 HMMWV:</b> <u>No</u> <i>*Note. No problems observed, however, at certain locations on the ramps, transit around staged vehicles required some 3-point turns to navigate.</i>
2.B(2)	(2) Suitability of lashing, tie-downs, pad-eyes on <b>Mezzanine ramp</b> .	(2) Once vehicles have successfully parked in designated locations on the <b>Mezzanine ramp</b> , the operators will attach appropriate tie-downs. DC's will assess the use of these tie-downs as maneuverability obstructions, deck space restrictions, stability enhancement, etc,. DC's will assess pad-eyes regarding location, quantity, strength, etc.,	(2) For each vehicle on the <b>ramp</b> , were tie-down devices: <ul style="list-style-type: none"> <li>-compatible</li> <li>-functional</li> <li>-operable</li> <li>-obstructive to maneuvering vehicles</li> <li>-squander / waste stowage space</li> </ul> <b>IFAV:</b> <u>Unk</u> <b>M998 HMMWV:</b> <u>Unk</u> <i>*Note. Appropriate tie-down devices were <b>NOT</b> available for testing. However, they may be <b>required</b> for IFAV / HMMWV sized vehicles on the Mezzanine ramp and deck during at-sea transits. Vehicle overhead clearance is minimal in these areas (about 1 inch). During at-sea transits any vertical motion will cause contact and possible damage to the vehicle. Appropriate tie-downs may reduce the vehicles "vertical" motion and therefore "reduce (not eliminate)" subsequent damage.</i>

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Event #	Event Description	Method	Data Evaluation
2.B(3)	(3) Suitability of staged vehicles on <b>Mezzanine ramp</b>	(3) After vehicles are parked on the <b>Mezzanine ramp</b> DC's will assess restricted access to operators/maintainers, efficient use of available deck space, proximity to obstructions (Horizontal/vertical), etc.,.	<p>(3) After vehicles were staged on <b>Mezzanine ramp</b>, was personnel accessibility restricted by proximity to other vehicles or obstructions (i.e. operator and maintainer access):</p> <p><b>IFAV:</b> <u>No</u>  <b>M998 HMMWV:</b> <u>No</u>  <i>*Note. No problems observed, however, at certain locations on the Mezzanine deck transit around staged vehicles required some 3-point turns to navigate.</i></p>
2.C 2.C(1)	<b>Mezzanine Deck</b> (1) Maneuverability & staging on Mezzanine <b>Deck</b> .	(1) Once vehicles have successfully transited the Mezzanine ramps and parked in designated locations on the <b>Mezzanine Deck</b> , operators will attach appropriate tie-downs. DC's will assess this event for lost deck space, maneuverability obstruction, etc.,.	<p>(1) During transit and staging on the Mezzanine <b>deck</b> did any vehicle experience maneuverability problems:</p> <ul style="list-style-type: none"> <li>-poor visibility</li> <li>-more than 5-point turns</li> <li>-loss of traction</li> <li>-contact with bulkhead-stanchion-other vehicles</li> <li>-cause damage to pad-eyes</li> <li>-able to access designated staging spots</li> </ul> <p><b>IFAV:</b> <u>No - Maneuverability</u>  <u>Unk - Staged</u></p> <p><i>*<u>Maneuverability Note</u>. The top outside edges of the vehicle's roof came <u>close</u> to bulkhead support beams that have angle inserts in all corners which reduce overhead clearance in those corner areas. Contact not likely but possible if vehicle takes wide approach.</i></p> <p><i>*<u>Staged</u>. There is concern for possible damage to IFAV size vehicles staged on the Mezzanine ramp and deck during at-sea transits. Vehicle overhead clearance is minimal in these areas (approx. 1 inch). During at-sea transits any vertical motion will cause vehicle contact with the overhead and possible damage to the vehicle. Appropriate tie-downs or increased overhead clearance is recommended.</i></p>

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Event #	Event Description	Method	Data Evaluation
2.C(1) (cont)	(1) Maneuverability & staging on Mezzanine Deck.	(1) Once vehicles have successfully transited the Mezzanine ramps and parked in designated locations on the <b>Mezzanine Deck</b> , operators will attach appropriate tie-downs. DC's will assess this event for lost deck space, maneuverability obstruction, etc.,.	<p><b>M998 HMMWV:</b>      <u>No - Maneuverability</u>  <u>Unk - Staged</u></p> <p><i>*<u>Maneuverability Note</u>. The top outside edges of the vehicle's roof came <u>close</u> to bulkhead support beams that have angle inserts in all corners which reduce overhead clearance in those corner areas. Contact not likely but possible if vehicle takes wide approach.</i></p> <p><i>*<u>Staged</u>. There is concern for possible damage to HMMWV size vehicles staged on the Mezzanine ramp and deck during at-sea transits. Vehicle overhead clearance is minimal in these areas (approx 1 inch). During at-sea transits any <u>vertical</u> motion will cause vehicle contact with the overhead and possible damage. Appropriate tie-downs or increased overhead clearance is recommended to protect the vehicle.</i></p>
2.C(2)	(2) Suitability of lashing, tie-downs, pad-eyes	(2) Once vehicles have successfully parked in designated locations on the <b>Mezzanine deck</b> , the operators will attach appropriate tie-downs. DC's will assess the use of these tie-downs as maneuverability obstructions, deck space restrictions, stability enhancement, etc.,. DC's will assess pad-eyes regarding location, quantity, strength, etc.,.	<p>(2) For each vehicle on the <b>Mezzanine deck</b>, were tie-down devices:</p> <ul style="list-style-type: none"> <li>-compatible</li> <li>-functional</li> <li>-operable</li> <li>-obstructive to maneuvering vehicles</li> <li>-squander / waste stowage space</li> </ul> <p><b>IFAV:</b>      <u>Unk</u>  <b>M998 HMMWV:</b>      <u>Unk</u></p> <p><i>*<u>Note</u>. Appropriate tie-down devices were NOT available for testing. However, they may be <u>required</u> for IFAV / HMMWV sized vehicles on the Mezzanine ramp and deck during at-sea transits. Vehicle overhead clearance is minimal in these areas (about 1 inch). During at-sea transits any vertical motion will cause contact and possible damage to the vehicle. Appropriate tie-downs may reduce the vehicles "vertical" motion and therefore "reduce (not eliminate)" subsequent damage.</i></p>

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Event #	Event Description	Method	Data Evaluation
2.C(3)	(3) Suitability of staged vehicles on <b>Mezzanine deck</b> .	(3) After vehicles are parked DC's will assess restricted access to operators/maintainers, efficient use of available deck space, proximity to obstructions (Horizontal/vertical), etc.,	<p>(3) After vehicles were staged on <b>Mezzanine deck</b>, was personnel accessibility restricted by proximity to other vehicles or obstructions (i.e. operator and maintainer access):</p> <p>IFAV: <u>No</u>  M998 HMMWV: <u>No</u>  <i>*Note. At least one side of every vehicle was accessible by personnel.</i></p>
2.D 2.D(1)	<b>Centerline Hoistable Ramp</b> (1) Maneuverability on Hoistable Ramp.	(1) Single test vehicle will transit the ramp from the main vehicle deck to the <b>Hoistable ramp</b> , via Mezzanine deck. With maneuver space minimized by parked vehicles/cargo, each test vehicle will attempt to traverse and park in various locations of the Mezzanine deck. Maneuverability will encompass turning radius, parking, backing, visibility, etc.,	<p>(1) During transit and staging on the <b>Hoistable Ramp</b> did any vehicle experience maneuverability problems:</p> <ul style="list-style-type: none"> <li>-poor visibility</li> <li>-more than 5-point turns</li> <li>-loss of traction</li> <li>-contact/near contact with bulkhead-stanchion-other vehicles</li> <li>-cause damage to pad-eyes</li> <li>-able to access designated staging spots</li> </ul> <p>IFAV: <u>Unk</u>  M998 HMMWV: <u>Unk</u>  <i>*Note. Prior to commencing the LOE, INCAT engineers determined that the Hoistable Ramp <u>did not</u> have the required deck strength to support any test vehicles. Therefore, the ramp was excluded form all testing.</i></p> <p><b>Recommendation:</b> (1) Increase ramp deck strength for small vehicle stowage, (2) Eliminate the ramp entirely and increase payload, (3) Provide appropriate access and utilize area as a <u>bulk cargo</u> stowage space. Otherwise the area is wasted.</p>

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Event #	Event Description	Method	Data Evaluation
2.D(2)	(2) Suitability of lashing, tie-downs, pad-eyes on the <b>Hoistable ramp</b> .	(2) After vehicles are parked on the <b>Hoistable ramp</b> , DC's will assess accessibility to operators/maintainers, efficient use of available deck space, proximity to obstructions (horizontal/vertical), etc.,	<p>(2) For each vehicle on the <b>Hoistable ramp</b>, were tie-down devices:</p> <ul style="list-style-type: none"> <li>-compatible</li> <li>-functional</li> <li>-operable</li> <li>-obstructive to maneuvering vehicles</li> <li>-squander / waste stowage space</li> </ul> <p><b>IFAV:</b> <u>Unk</u>  <b>M998 HMMWV:</b> <u>Unk</u>  <i>*Note. Prior to commencing the LOE, INCAT engineers determined that the Hoistable Ramp <u>did not</u> have the required deck strength to support any test vehicles. Therefore, the ramp was excluded form all testing.</i></p>
2.D(3)	(3) Suitability of staged vehicles on <b>Hoistable ramp</b>	(3) After vehicles are parked DC's will assess restricted access to operators/maintainers, efficient use of available deck space, proximity to obstructions (Horizontal/vertical), etc.,	<p>(3) After vehicles were staged on <b>Hoistable ramp</b>, was personnel accessibility restricted by proximity to other vehicles or obstructions (i.e. operator and maintainer access):</p> <p><b>IFAV:</b> <u>Unk</u>  <b>M998 HMMWV:</b> <u>Unk</u>  <i>*Note. Prior to commencing the LOE, INCAT engineers determined that the Hoistable Ramp <u>did not</u> have the required deck strength to support any test vehicles. Therefore, the ramp was excluded form all testing.</i></p>

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Event #	Event Description	Method	Data Evaluation
3.	<b>Human Factors &amp; Safety</b> A. Driver visibility on stern ramp B. Driver visibility on main vehicle deck C. Driver visibility on Mezzanine ramp D. Driver visibility on Mezzanine deck E. Driver visibility on Hoistable Ramp F. Driver ability to hear ground guide directions G. Ventilation on main vehicle deck H. "Fire Lanes" on main vehicle deck I. "Fire Lanes" on Mezzanine deck J. "Fire Lanes" on Hoistable Ramp		
3.A 3.A(1)	<b>Driver visibility on stern ramp</b> (1) Suitability of driver visibility of Ground Guide.	(1) DC observation & Driver/Ground Guide survey	(1) Was driver visibility of the ground guide <u>obstructed</u> during transit over the stern ramp?  <b>M923: <u>Unk</u></b> During one (1) transit "up" the starboard aft quartering ramp, the driver "briefly" lost visibility of the ground guide. It was determined that the ground guide was too close to the vehicle as it climbed the ramp. Once the M923 exited the ramp onto the main vehicle deck visibility was regained. The LOE Safety Officer corrected the Ground Guide. No further visibility problems were observed or reported.
3.A(2)	(2) Suitability of driver visibility of <b>Ramp and sides.</b>	(2) DC observation & Driver/Ground Guide survey	(2) Was any vehicle drivers visibility of the ramp and ramp sides obstructed during transit over the <b>stern ramp</b> ?  <b>M923: <u>Yes</u></b> During each transit of the M923 "up" the starboard aft quartering ramp, the driver "briefly" lost visibility of the ramp as the vehicle crested the highest point. Except for one instance (mentioned above) the M923 operator always had visibility of the ground guide.

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Event #	Event Description	Method	Data Evaluation
<b>3.B</b> 3.B(1)	<b>Driver visibility on main vehicle deck</b> (1) Suitability of driver visibility of Ground Guide.	(1) DC observation & Driver/Ground Guide survey	(1) Was any vehicle drivers visibility of the ground guide obstructed during transit over the <b>main vehicle deck</b> ?  <u>No</u>
3.B(2)	(2) Suitability of driver visibility of main vehicle deck, bulkheads, and stanchions.	(2) DC observation & Driver/Ground Guide survey	(2) Was any vehicle drivers visibility of the <b>main vehicle deck</b> , bulkheads, and stanchions obstructed during transit?  <u>No</u>
<b>3.C</b> 3.C(1)	<b>Driver visibility on Mezzanine ramp</b> (1) Suitability of driver visibility of Ground Guide	(1) DC observation & Driver/Ground Guide survey	(1) Was any vehicle drivers visibility of the ground guide obstructed during transit over the <b>Mezzanine ramp</b> ?  <u>No</u>
3.C(2)	(2) Suitability of driver visibility of Mezzanine Ramp and curbs	(2) DC observation & Driver/Ground Guide survey	(2) Was any vehicle drivers visibility of the ramp and ramp sides obstructed during transit over the <b>Mezzanine ramp</b> ?  <u>No</u>
<b>3.D</b> 3.D(1)	<b>Driver visibility on Mezzanine deck</b> (1) Suitability of driver visibility of Ground Guide	(1) DC observation & Driver/Ground Guide survey	(1) Was any vehicle drivers visibility of the ground guide obstructed during transit over the <b>Mezzanine deck</b> ?  <u>No</u>
3.D(2)	(2) Suitability of driver visibility of deck & bulkheads	(2) DC observation & Driver/Ground Guide survey	(2) Was any vehicle drivers visibility of the Mezzanine deck & bulkhead obstructed during transit?  <u>No</u>

## Marine Corps Warfighting Lab, Quantico, Virginia

Event #	Event Description	Method	Data Evaluation
<b>3.E</b> 3.E(1)	<b>Driver visibility on Hoistable ramp</b> (1) Suitability of driver visibility of Ground Guide	(1) DC observation & Driver/Ground Guide survey	(1) Was any vehicle drivers visibility of the ground guide obstructed during transit over the Hoistable ramp?  <b><u>Unk</u></b> <i>*<b>Note.</b> Prior to commencing the LOE, INCAT engineers determined that the Hoistable Ramp <u>did not</u> have the required deck strength to support any test vehicles. Therefore, the ramp was excluded form all testing.</i>
3.E(2)	(2) Suitability of driver visibility of deck & bulkheads	(2) DC observation & Driver/Ground Guide survey	(2) Was any vehicle drivers visibility of the deck and sides obstructed during transit over the Hoistable ramp?  <b><u>Unk</u></b> <i>*<b>Note.</b> Prior to commencing the LOE, INCAT engineers determined that the Hoistable Ramp <u>did not</u> have the required deck strength to support any test vehicles. Therefore, the ramp was excluded form all testing.</i>
<b>3.F</b> 3.F(1)	<b>Driver ability to hear ground guides.</b> (1) Adequacy of drivers hearing aboard HSV.	(1) DC observation & Driver/Ground Guide survey	(1) Was the driver able to hear ground guide commands during transit through the ship?  <b><u>No:</u></b> Verbal communication between operators and ground guides was <b><u>NOT</u></b> possible unless the vehicle was stopped and the guide approached the operators window and passed instruction face-to-face. A distinct and definitive set of "hand-and-arm" signals was required for adequate communication.
<b>3.G</b> 3.G(1)	<b>Ventilation on main vehicle deck</b> (1) Adequacy of exhaust ventilation on all vehicle stowage decks	(1) DC observation & Driver/Ground Guide survey	(1) Was there a noticeable build-up or accumulation of exhaust fumes during vehicle maneuverability events?  <b><u>Unk:</u></b> There were brief moments during the LOE when multiple vehicles were operating in the main deck that fumes were noticed, but they quickly dissipated due to the vessels natural ventilation.



## Marine Corps Warfighting Lab, Quantico, Virginia

Event #	Event Description	Method	Data Evaluation
<b>3.H</b> 3.H(1)	<b>"Fire Lanes" on main vehicle deck</b> (1) Adequacy of fire lanes around embarked equipment on main vehicle deck	(1) DC observation & SME survey	(1) Were fire lanes present and accessible around all staged vehicles on the <b>main vehicle deck</b> ?  <u>Yes</u>
<b>3.I</b> 3.I(1)	<b>"Fire Lanes" on Mezzanine ramp and deck</b> (1) Adequacy of fire lanes around embarked vehicles on Mezzanine deck	(1) DC observation & SME survey	(1) Were fire lanes present and accessible around all staged vehicles on the <b>Mezzanine ramps and deck</b> ?  <u>Yes</u>
<b>3.J</b> 3.J(1)	<b>"Fire Lanes" on Hoistable ramp</b> (1) Adequacy of fire lanes around embarked vehicles on Mezzanine deck	(1) DC observation & SME survey	(1) Were fire lanes present and accessible around all staged vehicles on the <b>Hoistable ramp</b> ?  <u>Unk</u> <i>*Note. Prior to commencing the LOE, INCAT engineers determined that the Hoistable Ramp <u>did not</u> have the required deck strength to support any test vehicles. Therefore, the ramp was excluded form all testing.</i>
		<i>Note..... All of the following assessment events for "Vehicle Embarkation Characteristics" will be reviewed during <u>LOE PHASE 3</u> (High-speed transit to BIC from MHCNC) during the week of <b>26-30 Nov 01</b>.</i>	
<b>4.</b>	<b>Vessel Embarkation Characteristics</b> A. Starboard-Aft Quartering Ramp B. Vehicle Stowage Areas C. Human Factors & Safety		

## Marine Corps Warfighting Lab, Quantico, Virginia

Event #	Event Description	Method	Data Evaluation
<b>4.A</b> 4.A(1)	<b>Starboard-Aft Quartering Ramp</b> (1) Verify ramp "deck" strength	(1) Review Loading & Embarkation Characteristics	(1) PSF Rating: _____
<b>4.B</b> 4.B(1)	<b>Vehicle Stowage Areas</b> (1) Determine deck and "internal" ramp strengths	(1) Review Loading & Embarkation Characteristics	(1) PSF Rating: _____
4.B(2)	(2) Determine <u>SQFT &amp; CUFT</u> in all vehicle stow areas	(2) Review Loading & Embarkation Characteristics	(2) SqFt: _____ CuFt: _____
4.B(3)	(3) Determine vessels "maximum" <u>payload capacity</u> by weight, sqft, cuft	(3) Review Loading & Embarkation Characteristics	(3) Max Payload: _____ STons
4.B(4)	(4) Determine effects of "combat loading" on payload capacity	(4) Review Loading & Embarkation Characteristics	(4) Is there a negative impact? Yes    No    Unk
<b>4.C</b> 4.C(1)	<b>Human Factors &amp; Safety</b> (1) Determine adequacy of Fire Fighting & Safety Equipment placement / distribution	(1) SME's observe-verify	(1) Is Fire Fighting & Safety Equipment placement / distribution adequate? Yes    No    Unk
4.C(2)	(2) Determine "adequacy" of Berthing & Work spaces	(2) SME's observe-verify	(2) Are Berthing & Work spaces adequate? Yes    No    Unk
4.C(3)	(3) Determine "adequacy" of Sanitation Facilities (toilets, showers, trash)	(3) SME's observe-verify environmental control, HVAC, personal gear stowage, etc.,	(3) Are Sanitation Facilities adequate? Yes    No    Unk
4.C(4)	(4) Determine "adequacy" of Messing facilities	(4) SME's observe-verify	(4) Are Messing facilities adequate? Yes    No    Unk
4.C(5)	(5) Determine "adequacy" of crew training	(5) SME's observe-verify	(5) Is crew training adequate? Yes    No    Unk

## Marine Corps Warfighting Lab, Quantico, Virginia

Event #	Event Description	Method	Data Evaluation
4.C(6)	(6) Determine adequacy of HAZMAT & Fuel stowage	(6) Ship Loading & Embarkation Characteristics	(6) Are HAZMAT & Fuel stowage adequate?  Yes    No    Unk
4.C(7)	(7) Determine adequacy of the Medical "facility"	(7) SME's observe-verify	(7) Is the Medical "facility" adequate?  Yes    No    Unk
4.C(8)	(8) Determine adequacy of "Safety Documentation" provided by the owner	(8) Review INCAT Safety Assessment Report	(8) Is the Safety Documentation adequate?  Yes    No    Unk
4.C(9)	(9) Determine "adequacy" of protective measures against EM hazards to personnel, volatile fuels, and HazMat.	(9) Ship Loading & Embarkation Characteristics	(9) Are the protective measures against EM hazards to personnel, volatile fuels, and HazMat adequate?  Yes    No    Unk
4.C(10)	(10) Verify that ship systems do not create adverse health environments for embarked personnel.	(10) Ship Loading & Embarkation Characteristics	(10) Do ship systems create any adverse health environments for embarked personnel?  Yes    No    Unk